

Figure C-17. Ku-Band Beams at 8.5°E Orbital Position

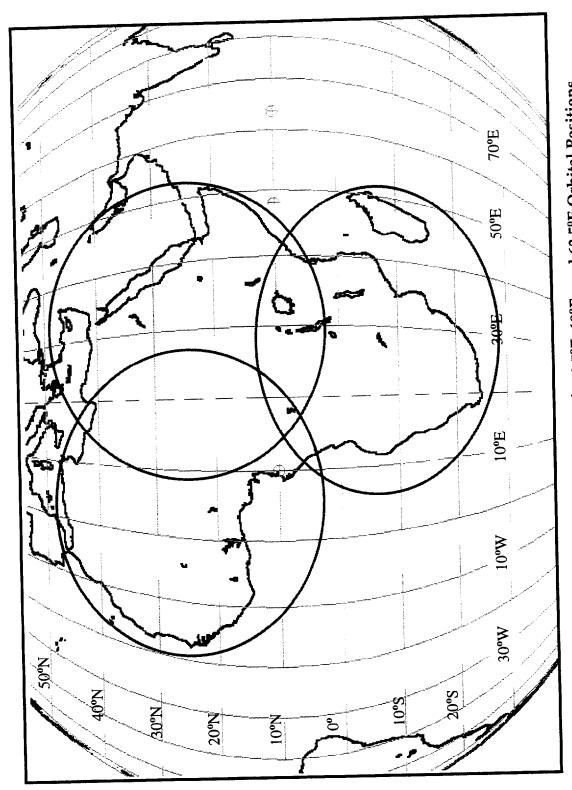


Figure C-18. Receive Ku-Band 6° Beams for 8.5°E, 48°E, and 63.5°E Orbital Positions

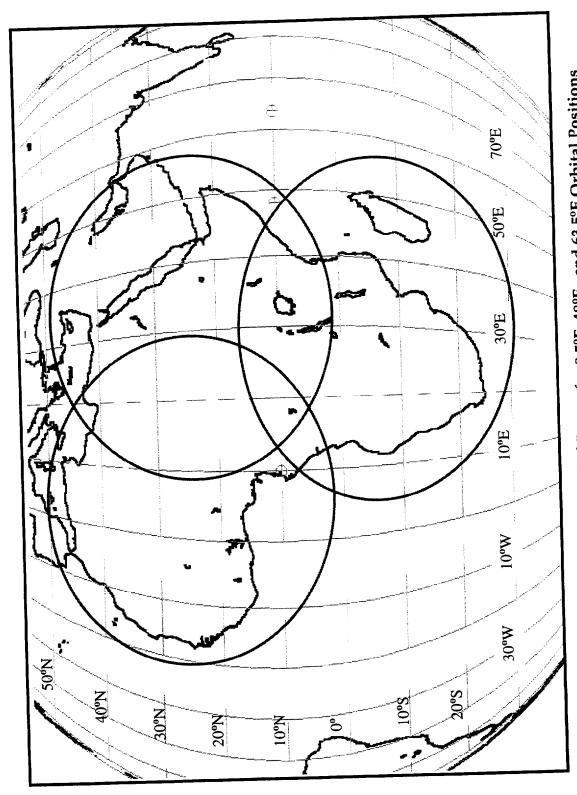


Figure C-19. Transmit Ku-Band 6° Beams for 8.5°E, 48°E, and 63.5°E Orbital Positions

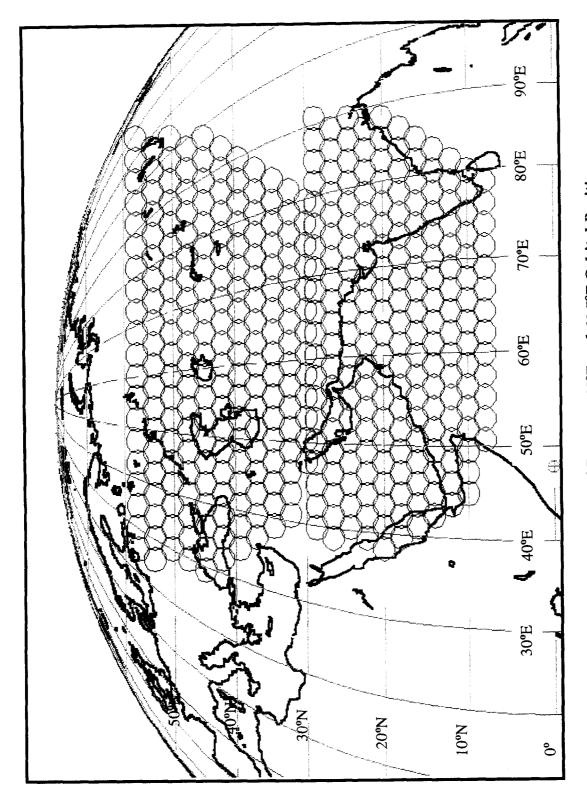


Figure C-20. V-Band Beams at 48°E and 63.5°E Orbital Positions

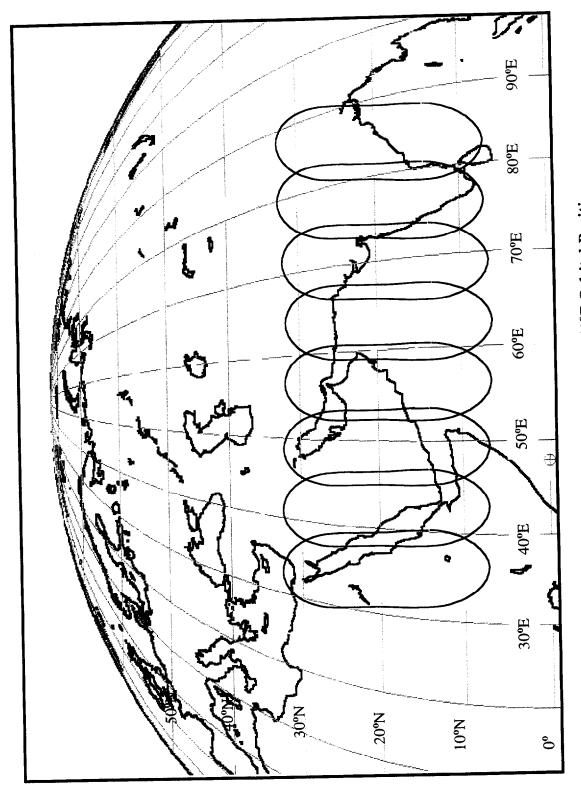


Figure C-21. Ku-Band Beams at 48°E Orbital Position

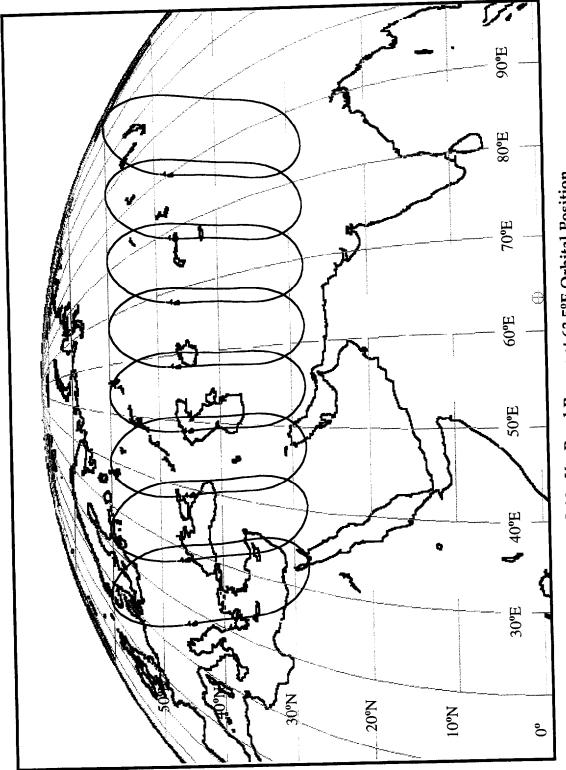


Figure C-22. Ku-Band Beams at 63.5°E Orbital Position

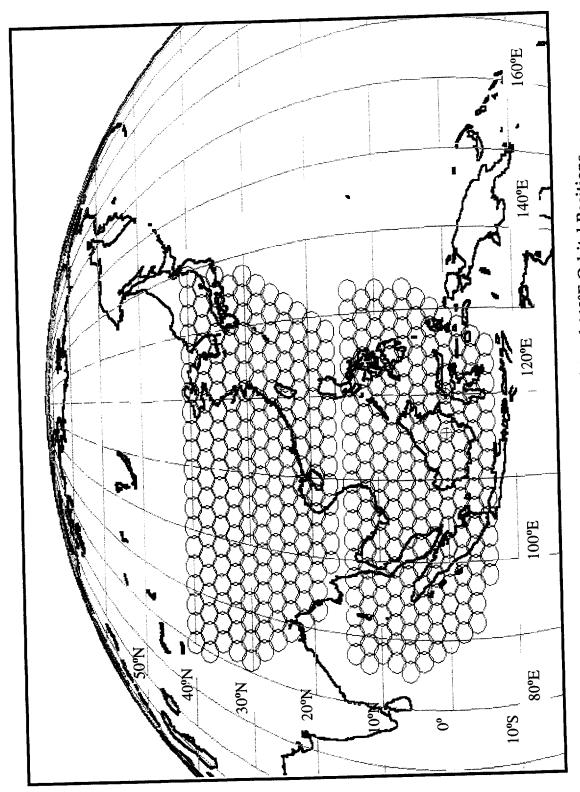


Figure C-23. V-Band Beams at 113°E and 119°E Orbital Positions

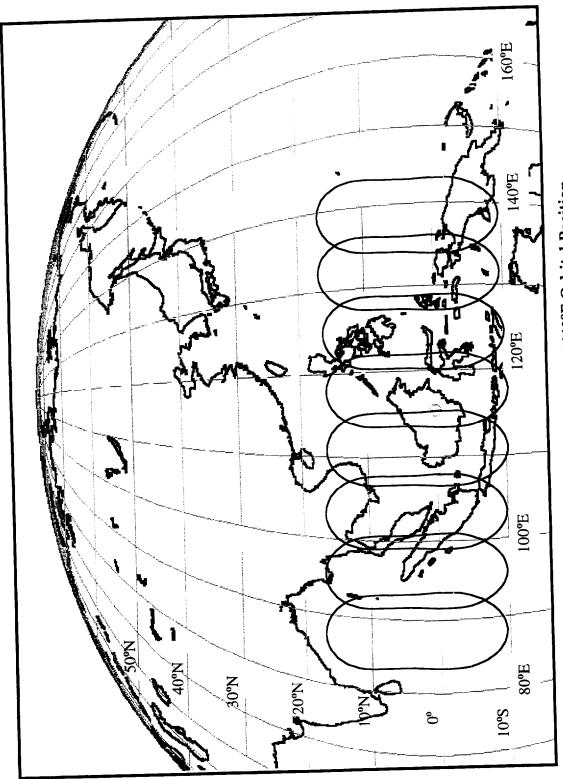


Figure C-24. Ku-Band Beams at 113°E Orbital Position

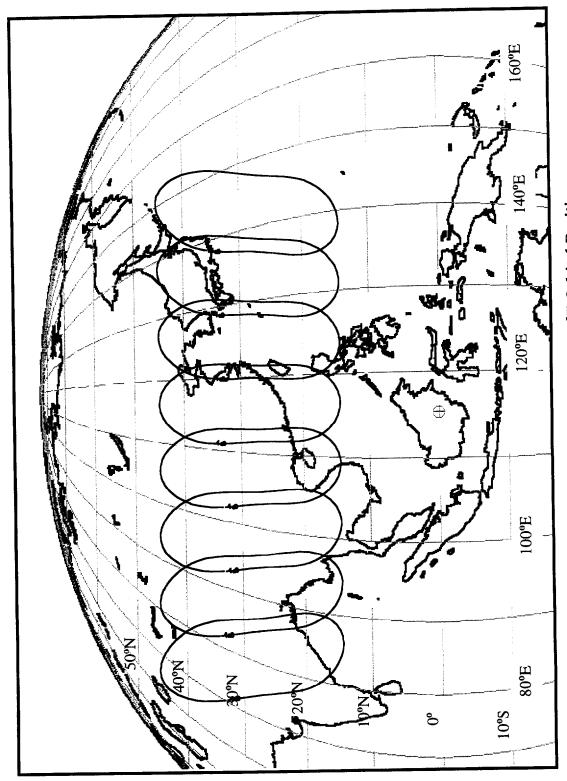


Figure C-25. Ku-Band Beams at 119°E Orbital Position

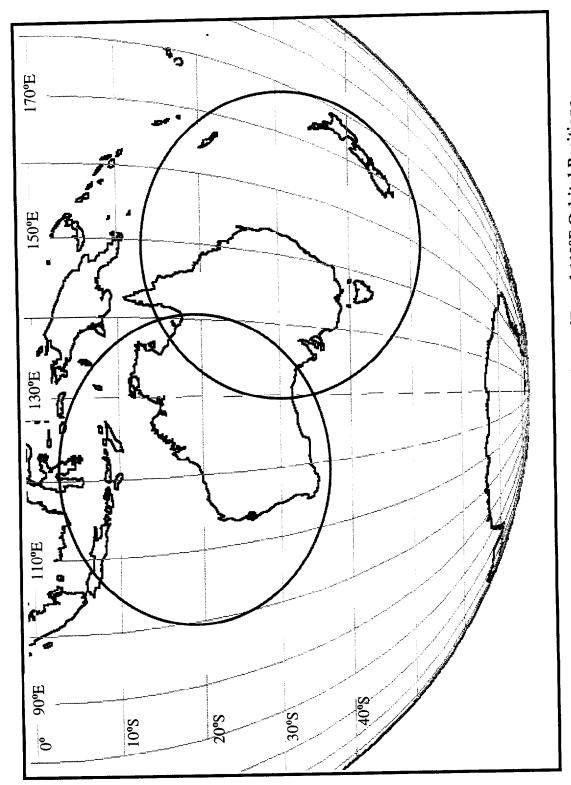


Figure C-26. Receive Ku-Band 6° Beams for 113°E and 119°E Orbital Positions

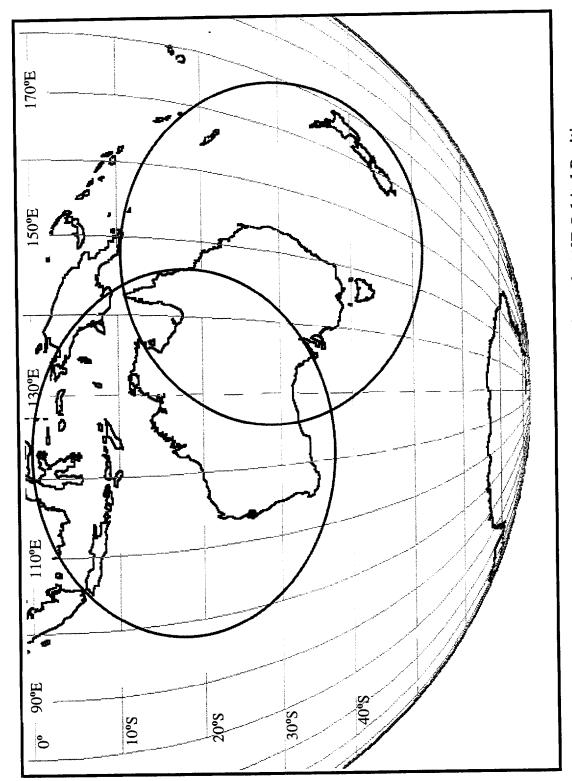


Figure C-27. Transmit Ku-Band 6° Beams for 113°E and 119°E Orbital Positions

# APPENDIX D: FINANCIAL REPORT



HOWARD HUGHES
Pioneer Howard
Hughes founded
Hughes Aircraft
Company in 1932.
Two years later he set
his first aircraft speed
record in the "H-1
racer" In 1938, the
aviation pioneer and
his crew were the
first to fly non-stop
around the world

FALCON MISSILE
The world's first air-toair, radar-guided missile
was Hughes' Falcon.
The company produced
more than 50,000
Falcons between
1952 and 1963

LASER
In 1960. Hughes
scientists achieved
the first successful
operation of a ruby
laser, a breakthrough
hailed as one of this
century's most
important engineering
achievements.

PIONEER VENUS
The first extensive mapping of Venus using radar was a major achievement of the Pioneer Venus space mission, which began in 1978. Hughes built the orbiting spacecraft and the probe that carried the instruments to collect data for the National Aeronautics & Space Administration.

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SYNCOM
Hughes launched the
world's first synchronous
satellite in 1963. Syncom
transmitted the first highquality voice message
between two U.S. Navy
ships on opposite sides of
the Atlantic Ocean and
paved the way for the
commercial satellite
communications industry.

RADAR
The first tactical air-to-air
fire-control radar,
delivered in 1949 to the
U.S. Air Force, was
named the "Hughes E-1."
This innovative new radar
enabled a pilot to fire at a
target he could not see.

GM SUNRAYCER
Hughes' advanced solar
energy technologies
were vital components
of the GM Sunraycer, an
innovative solar-powered
electric General Motors
vehicle that in 1987 won
the grueling 1,950 mile
World Solar Challenge
race across Australia.

SURVEYOR 1
In 1966, Hughes'
unmanned Surveyor 1
was the first spacecraft
to make a controlled,
soft landing on the
moon. Hughes
designed and built
seven Surveyor
spacecraft, which led
the way for future
manned landings.

DIRECTV
Hughes launched
DIRECTV®, the
nation's first highpowered digital
direct broadcast
satellite television
service, in 1994.
Customers receive
signals with the
DSS® system,
which features an
18-inch satellite
dish, receiver unit
and remote control.

Message to Shareholders...
The vision that is reshaping Hughes
See Page 2

Financial Highlights at a glance
See Page 5

Automotive Electronics...

Making changes at Delco Electronics

See Page 6

Aerospace & Defense Systems...
Winning in a tough market
See Page 10

Telecommunications & Space...
Planning for a "Wireless Expressway"
See Page 14

Research & Development...

Concepts are turned into advanced products at Hughes Research Laboratories

See Page 26

Operating & Financial Review See Page 27

Hughes Electronics Corporation, a subsidiary of General Motors Corporation, designs, manufactures and markets advanced electronics equipment and services. The markets for the company's products and services are undergoing dramatic changes, and to remain a financial, market and technology leader, Hughes must change, too. This annual report, following the theme of Building on Strength -Launching the Future, reviews the strengths of Hughes Aircraft Company, Delco Electronics and the Telecommunications & Space companies, and outlines opportunities and plans for these operations.



# MESSAGE TO SHAREHOLDERS

## Building on Strength...LAUNCHING THE FUTURE

Most annual reports offer a look back. vev of the year that was. For Hughes Electronics, this report marks a major change in our company. Not only does it outline a year of goals met and gains made: it also describes the substantial strengthening of our business segments and the unlocking of shareholder value expected from three significant transactions

It's become a cliché to note the pace of change in our global economy. Yet if our competitive environment is teaching us any lessons

"We look forward to a more focused participation in the Information Age with the excitement that comes from having both the technology and the services that satisfy market needs."

at all, it is that it's not enough to lead the man ket of the moment. To stay on top, a company has to see over-the-horizon, to anticipate the changes and challenges ahead, to see before others see them - not just obstacles but oppor tunities. That is the key reason Hughes Electronics made its decision to look beyond its success in today's markets, to restructure and refocus itself for the future

On January 16, 1997, GM, Hughes and Raytheon announced their plan, pending final government and shareholder approvals, to 1) spin off Hughes Aircraft Company (HAC. after which it will merge with Raytheon; 2) transfer Delco Electronics to GM's Delphi Automotive Systems: and 3) recapitalize GM's Class H common stock - creating a new tracking stock linked to the performance of Hughes Electronics' telecommunications and space businesses.

That's the "what." As for the "why" behind the transactions, we must simply look to the competitive market around us. 1996 saw the continued post-Cold War consolidation of the defense sector, driven by more downward pressure on

defense procurement that has cut the overall defense budget in half since the height of the 1980's buildup. A new wave of mega-mergers is redefining the meaning of critical mass, such that we believed

> the best future for HAC was in combination with another industry leader. HAC's merger with Raytheon offers our customers a stronger critical mass of programs. skills and investment that will be sustainable while enabling reduced costs. The merger should also offer GMH shareholders excellent value in the face of the defense industry's restructuring.

Just as the defense sector dictated the need for redefinition, the evolu-



left to right:

Charles H. Noski Vice Chairman and Chief Financial Officer

C. Michael Armstrong Chairman of the Board and Chief Executive Officer

Michael T. Smith Vice Chairman

tion of the automotive electronics industry also dictated change. Customers' desire for systems rather than separate components created a natural alliance for Delco and Delphi – opportunities in combination that neither alone could seize. Delco Delphi will possess capabilities unmatched in the automotive electronics industry, a single entity possessing the breadth and potential to deliver integrated systems at the lowest cost.

Finally, the transactions enable us to take our telecommunications and space businesses to a new level – a chance to bring significantly greater financial resources and a sharper focus of our management, talent and technology to the emerging markets for space and satellite communications. This is an important step as we work to realize our vision of a Wireless Expressway<sup>151</sup> – an Information Skyway – using space and satellites to offer instant, affordable and ubiquitous delivery of data, voice and video.

We look forward to a more focused participation in the Information Age with the excitement that comes from having both the technology and the services that satisfy market needs – and a price performance that sets us apart.

- In satellites, we will introduce the most capable, powerful and versatile satellite family in the industry with the launch of our HS 702.
- In networks, we will appeal to a wider Internet user base as we continue to drive down the costs of Turbo Internet<sup>14</sup>, a satellite-based interactive Internet service that provides speeds 14 times more rapid than today's telephone lines.
- In our soon-to-be-completed merger with PanAmSat, we will expand our global capacity by more than 70% in the next couple of years as we bring needed communications infrastructure to a world evolving toward a single market.
- In DIRECTV\*, we will introduce PC-based services that bring access to the Internet, DIRECTV programming, a menu of Web sites

and multi-media magazines – all to a single dish serving both your television and personal computer.

• Internationally, Galaxy Latin America will expand its coverage to include all of the 90 million television households of Latin America and the Caribbean, while the expected launch within a year of DIRECTV Japan will take our direct-to-home service to a country that is only 4% cable-penetrated, yet is mature in its interest in entertainment, information and education.

"Using technology, talent and investment to lead in markets, to build new businesses, to create new value: that's what the new Hughes Electronics will be all about."

### BUILDING ON STRENGTH...Launching the Future

For Hughes Electronics, 1996 marked a year of goals met and ground gained, paving the way for the transactions announced in January 1997.

Aerospace and Defense Systems:

For the year, Hughes Aircraft Company reported a nearly 7% increase in revenues, to \$6.3 billion. Equally important, HAC maintained its double-digit margins, as well as a sizable \$8.2 billion backlog in missiles, sensors and information systems and services. In the downsized defense procurement environment, HAC posted an impressive 77% win ratio for the competitions it entered. Finally, in the key area of international growth, 1996 saw an increase of 80% for international orders.

AUTOMOTIVE ELECTRONICS:

Delco Electronics ended 1996 retaining its industry lead in market share, while posting a 20% rise in international and non-GM North American Operations sales. A fourth-quarter

reorganization strengthened Delco to deal with a challenging competitive environment, making possible new steps toward rightsizing and structural cost reductions, accelerated technology introduction into GM's North American Operations, and a realignment of international operations to sharpen focus on profitable growth.

THE COMMENICATIONS AND SPACE:

As the fastest growing segment of Hughes Electronics. Telecommunications and Space posted a 33% growth rate in 1996 — with total revenues of \$4.1 billion. Hughes Space and Communications increased revenues by 21%. Hughes Network Systems broke the \$1 billion revenue threshold for the first time, while the PanAmSat merger announcement marked a major milestone on the path to a truly global communications service. DIRECTV in the United States, attained a subscriber base of 2.5 million in early 1997, making it equivalent in size to the nation's seventh largest cable television company.

Using technology, talent and investment to lead in markets, to build new businesses, to create new value: that's what the new Hughes Electronics will be all about. With more focus on our markets, with capital available for investment and with a team that has proven it makes a difference, our new dedicated company will give us more potential to create value.

It is never easy to so significantly restructure a

business that is succeeding. Employee lives are disrupted, customer relationships must be preserved, shareholders need to be assured and satisfied even as the need to do daily battle with the competition continues.

Yet, at each stage in our company's history. Hughes has always been a place where people accept change as challenge—a company that's been too busy defining the future to be afraid of it. We are confident the changes we're making in 1997 will serve to solidify the one constant through Hughes' long history—securing this company's legacy as an industry leader for years to come.

C. Michael Armstrong

Chairman of the Board and Chief Executive Officer

Charles Thank

Charles H. Noski

Vice Chairman and Chief Financial Officer

Michael T. Smith

Vice Chairman

# HUGHES ELECTRONICS CORPORATION

# Financial Highlights\*

(Dollars in Millions, Except Per Share Amounts)	1996	1995	1994	
FOR THE YEAR				
Revenues	\$15,918	\$14,808	\$14,099	
Net Sales	15,744	14,714	14,062	
Earnings	1,151	1,108	1,049 11	
% of Revenues	7.2%	7.5%	7.4%	
Operating Profit (2)	\$ 1,594	\$ 1,667	\$ 1,630	
% of Net Sales	10.1%	11.3 %	11 6%	
Earnings Attributable to General				
Motors Class H Common Stock				
Total	\$ 283	\$ 265	<b>\$</b> 242 <sup>(1)</sup>	
Per Share	2.88	2.77	2.62 <sup>(1)</sup>	
Dividends Per Share of				
GM Class H Common Stock	0.96	0.92	0.80	
Average Number of Shares of				
GM Class H Common Stock				
Outstanding (in millions)	98.4	95.5	92.1	
Capital Expenditures (3)	\$ 840	\$ 820	<b>\$</b> 746	
Research and Development Expenses	730	762	699	
Return on Equity (4)	19.0%	20.8%	22.9% <sup>(1)</sup>	
Pre-Tax Return on Total Assets (5)	13.1%	14.0 %	14.5%	
AT YEAR-END				
Cash and Cash Equivalents	\$ 1,161	\$ 1,140	\$ 1,502	
Backlog	15,100	14,929	13,210	
Number of Employees (in thousands)	86	84	. 79	

<sup>\*</sup> Financial Highlights are unaudited and exclude purchase accounting adjustments related to GM's acquisition of Hughes Aircraft Company

<sup>(1)</sup> Includes the unfavorable effect of accounting change of \$30 million, or \$0.08 per share of GM Class H common stock.

<sup>(2)</sup> Net Sales less Total Costs and Expenses other than Interest Expense.

<sup>(3)</sup> Includes expenditures for telecommunications and other equipment of \$188 million in 1996. \$275 million in 1995, and \$256 million in 1994.

<sup>(4)</sup> Earnings Used for Computation of Available Separate Consolidated Net Income divided by average stockholder's equity (General Motors' equity in its wholly-owned subsidiary, Hughes Electronics). Holders of GM Class H common stock have no direct rights in the equity or assets of Hughes Electronics, but rather have rights in the equity and assets of GM (which includes 100% of the stock of Hughes Electronics).

<sup>(5)</sup> Income before Income Taxes divided by average total assets.

# E E CIRONICS

elso Electronics Purthermore, DE DE's products are core components of auto cockpit instrumentation

Delco Electronics (DE) has been one of the world's largest providers of automotive electronics for many years—achieving a 22 percent global market share in 1996—and the company intends to remain at the top of this \$24 billion market.

Vital components of DE's continued global leadership are its growth with nonFurthermore, DE continues to demonstrate its technology leadership. Its navigation and communications technologies are found in the new OnStar" on-vehicle communications system for the 1997 Radiate; its advanced electronics are part of GM's EV1" electric vehicle, and a variety of DE designed and manufactured compunents are found on 12 new GM models.

**(( ( )** 

DE's products are core components of auto cockpit instrumentation displays, controls that increase safety and comfort, as well as audio systems that provide entertainment.

The automotive industry has been undergoing major structural changes. Automakers are seeking suppliers who can give them more costeffective systems solutions rather than individual components. To maintain its leadership position in this changing marketplace, DE has been undertaking a realignment of its operations.

DE's traditional focus has been on designing and manufacturing vehicle electronics, and it has long been a world leader in its field. The company's broad product line – developed over 60 years – includes engine and transmission controls; antilock brake control modules; air bag electronics; vehicle security electronics: and audio, climate control, navigation and communications systems.

Since these products complement those of Delphi Automotive Systems, the GM sector that produces automotive components and systems, DE has been working more closely with Delphi. For the last several years, the two companies have been co-locating many of their international facilities. Together, the two companies have begun offering

nies have begun offering automakers inte-

ustomers inc alts showed zans in th

to mers hicreased to 19 percess of total DE revenues, 2.4 percent increases

The 1997 Editorolet Corvette (estatuse 10 of DE's advanced technologies, including sytem that improve performance, security and driver safety.



AUGENE.

grated electronic and mechanical systems solutions, such as Traxxar. This system increases vehicle stability and safety by integrating steering, braking and suspension electronic controls. Traxxar is being marketed on the 1997 Cadillac as StabiliTrak. Assuming the pending transfer of Delco Electronics to Delphi Automotive Systems occurs later in 1997 - see page 28 for further details), the new partnership will have an even greater competitive edge in the global marketplace.

Another facet of DE's realignment was the appointment in 1996 and early 1997 of a new senior management team, headed by General Manager Michael J. Burns. In 1997, DE's management will continue to improve the company's competitiveness by satisfying customers with cost savings and lower prices plus high manufacturing performance standards; expanding international operations with an increased emphasis on profitable growth; and continuing technology leadership.

### Satisfying Customers

DE's focus on customer satisfaction stresses cutting costs and striving for manufacturing excellence through on-time delivery and products with zero defects.

Reduce Costs. The company made further progress in cutting costs in 1996. However, work stoppages at several North American GM plants, intensified global price competition and ongoing investment in international expansion reduced DE's operating margin.

DE continues to achieve cost reduction by incorporating the latest advances in technology into its products more rapidly than many of its competitors. DE also is redesigning its products to decrease the number of parts it buys for each system. Both cost-saving approaches are essential for the company to remain a world-leading supplier to its automotive customers.

M6NS99 An example of how redesign can dramatically impact costs is DE's new generation of sensors for air bag systems, the SDM-R, which employs nearly 50 percent fewer parts and is priced almost 60 percent lower than the previous design - and offers comparable functionality, performance and quality. Another successful redesign effort focused on the company's GEN-II manifold pressure sensor, which helps increase a car's performance. Through redesign, DE cut the number of assembly components nearly in half and improved reliability compared with its predecessor design.

Because purchased materials account for more than 50 percent of the cost of the company's products, redesign continues to have the greatest potential for reducing costs in future vears for all of DE's customers.

Another way DE attacked costs in 1996 was by continuing to rationalize and integrate its processes. For example, by establishing uniform processes for engineering teams, DE was able to eliminate significant non-value-added costs. In 1997, another important component of its realignment efforts is to lower structural costs by streamlining the organization.

Ensure Quality. DE has set high standards for each part of its operations and expects continuous improvement toward achieving them. This helps assure that the company will meet its

goal of delivering products to customers on time and manufacturing products with zero defects. In addition, the company has received certification by independent experts. In

1995, DE achieved ISO 9000 certification, a well-regarded interna-



sell cars when they offer

Monsoon as an option

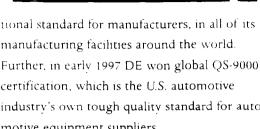


Rockford Fosgate's radios are supplied by DE. These high-performance auto sound systems are available to consumers through independent and regional distributors.



Many of the components and systems in GM's EV1 electric vehicle were developed by DE The company's inverter (near right), the propulsion system's brain, converts direct current stored in the batteries to alternating current required by the electric motor.

DE's MagneCharge™ inductive charging system (far right) provides a safe, efficient and convenient way to fill up the car



### Expanding Globally with a Focus on Profitability

A key part of DE's long-term growth strategy is to diversify its customer base, and sales to international and non-GM-NAO customers increased to more than \$1 billion in 1996, compared with \$841 million in 1995. Globally, DE has approximately 50 non-GM-NAO customers. The company is continuing to expand, but with an intensified focus on the profitability of its operations.

International Expansion. In 1996, DE:

· Opened a new design facility in Singapore that will serve Pacific Rim customers;

tional standard for manufacturers, in all of its manufacturing facilities around the world. Further, in early 1997 DE won global QS-9000 certification, which is the U.S. automotive industry's own tough quality standard for automotive equipment suppliers.



- · Dedicated a new facility in Piracicaba, Brazil, that is manufacturing parts for automakers serving the South American market, including GM do Brasil:
- Opened a high-tech manufacturing facility in Liverpool. England, that is supplying DE's hybrid engine control unit and other electronics to European customers, and;
- · Announced a joint venture, named Shanghai Delco Electronics & Instrumentation Co., Ltd., that is manufacturing a wide variety of automotive products in Shanghai, China, for the Chinese market.

New International Contracts. Among DE's international wins in 1996 was a breakthrough contract for audio systems from Daihatsu Motor Company. For the first time, DE will be supplying radios on cars to be sold to Japanese consumers.

### Continuing Technology Leadership

DE continues to develop new technology to maintain its competitive edge. DE, Hughes Network Systems and EDS have teamed to support GM's OnStar smart car system, intro-

> duced in 1997 Cadillacs. OnStar incorporates DE's automobile satellite navigation system that employs the Global Positioning System. Delco technologies also enable OnStar to pro-

vide emergency message capability and other services.

In addition, DE developed more than 15 innovative technologies for GM's new EV1

DE was a pioneer developer of hybrid manifold pressure sensors, a product now used by customers around the world. In 1996. DE won the prestigious PACE Award from Automotive News for improvements in the design and production of these sensors



electric vehicle, which was introduced in California and Arizona in 1996, including the vehicle's power electronics bay and the MagneCharge inductive charging system.

And DE's PASS-Key' III security system is a standard feature on Buick's all-new Park Avenue. PASS-Key III offers a theft-deterrent system that is set to one of 68.7 billion codes. The system electronically determines if the correct key has been inserted into the vehicle ignition; if not, it sends a message to the engine control system that prevents the carfrom starting.

Looking ahead, DE engineers are working on smart occupant sensing, employing weightbased and infrared sensing devices to improve the safety of air bag systems by adjusting deployment according to the size and location of the occupant.

### Becoming an Even Tougher Competitor

The proposed transfer of DE to Delphi later in 1997 is designed to meet the changing needs of the vehicle marketplace. By combining the strengths of the two companies, management expects to achieve greater efficiencies and to create an industry-leading supplier with an



unparalleled portfolio of electronically enhanced vehicle systems.

Reducing the duplication of resources should significantly improve the total cost structure. In addition, the DE-Delphi team will be able to offer better customer service by sharing commercial accounts, customer contacts and a global customer support network. With all of these advantages, the DE-Delphi team will be a much tougher competitor in the global automotive marketplace.

EyeCue® increases safety by projecting critical vehicle information on the windshield. allowing drivers to keep their eves on the road. DE's innovative system is available for cars and trucks.

GM North Operations

Europe

Asia/Pacific

& Others



Percentage of 1996 Revenues by **Customer Group** 

# The following table sets forth selected pro forma data for the Automotive Electronics segment.

Years	Ended	December	31
-------	-------	----------	----

, , , , , , , , , , , , , , , , , , , ,			
1996	1995	1994	
\$5,350.8	\$5,561.3	\$5,221.7	
33.6%	37.6%	37.0%	
\$5,311.3	\$5,479.7	\$5,170.6	
654.0	869.0	794.8	
12.3%	15.9%	15.4%	
\$3,394.9	\$3,267.4	\$3,429.8	
195.9	151.4	142.2	
196.0	264.7	166.4	
	\$5,350.8 33.6% \$5,311.3 654.0 12.3% \$3,394.9 195.9	\$5,350.8 \$5,561.3 33.6% \$7.6% \$5,311.3 \$5,479.7 654.0 869.0 12.3% 15.9% \$3,394.9 \$3,267.4 195.9 151.4	

Certain amounts for 1995 have been reclassified to conform with 1996 classifications.



Percentage of **Hughes Revenues** 

<sup>(1)</sup> Net Sales less Total Costs and Expenses other than Interest Expense.

<sup>(2)</sup> Operating Profit as a percentage of Net Sales.

ughes Aircraft 1 Company (HAC) is an acknowledged leader in its core missile, sensor and information systems programs. It participates in about half of the U.S. tactical missile programs, provides radars to four out of five frontline U.S. fighter aircraft, and has developed 65 percent of the world's air defense systems.

In 1996, revenues grew 6.6 percent to \$6.3 billion and backlog grew 6.2 percent to \$8.2 billion. HAC achieved an operating profit margin of 11 percent, the fourth year in a row of double digit profit margins. International new orders rose 80 percent.

declining defense but gets, HAC won 77 systems for the percent of all the



The HAWK-AMRAAM hybrid integrates the HAWK system, deployed in 19 countries, with the increased firepower of Hughes AMRAAM® missile to provide a modern, affordable air defense system.

competitions it entered, increasing its contract win ratio by 17 percent over 1995. In its fast-growing information and military computer systems and services businesses, HAC won contract awards for supplying U.S. Air Force personal computers and workstations, maintaining Even in the face of ... U.S. Navy depots, and developing navigation

Federal Aviation Administration. These new contracts have combined potential revenues of more than \$3 billion over

five years.

The accomplishments of HAC and its people have enabled it not only to post excellent financial results, but also to meet the challenges of dynamic global defense markets and create an outstanding merger opportunity in a rapidly consolidating industry

(see page 28 for further details).

HAC delivered on its strategies last year and will continue to do so in 1997. The major strategies are: strengthening its leadership position through consolidations and realignments; providing advanced technologies at low cost; increasing its domestic defense program win/loss ratio; and expanding international sales.

### Strengthening Leadership

Reorganization/Consolidation. The organization of HAC's considerable technologies, skills and assets was further refined in 1996 with the consolidation of the company's Electro-Optical Systems business unit and the Radar and Communications business unit into a Sensors and Communications Systems unit, whose programs include space, airborne and surfacebased radars; lasers, infrared and other sensors: and military communications.

After this consolidation, HAC has three primary business units. The other two are Weapons Systems – responsible for numerous cruise missile and tactical programs, and shipboard display and control systems; and

Information Systems focusing HAC's expertise in building complex software-intensive systems for command and control, air defense, training and simulation, and intelligence-gathering.

The Hughes APG-73 radar is being integrated with the AMRAAM missile and other weapons during operational testing of the F/A-18 E/F